LIVERMORE LAB REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, Sept. 12-16, 2011.

NewScientist **CLEAN ENERGY ON THE HORIZON**

The target chamber at NIF

There's a big new kid on the nuclear energy block. Last week, British firm AWE (formerly the Atomic Weapons Establishment), based in Aldermaston, the Rutherford Appleton Laboratory in Harwell, UK, and LLNL have agreed to team up to develop laser fusion as a clean energy source.

ICF involves heating a pellet of fuel with powerful lasers. In the case of NIF, that is 192 laser beams.

Laser fusion is an alternative to magnetically induced nuclear fusion, which is used in the Joint European Torus (JET) now operating in Culham, UK, and the test reactor ITER, under construction in Cadarache, France.

Historically, laser fusion has been used and focused mostly on weapons testing, while power generation research has concentrated on magnetic fusion.

But the Lab's National Ignition Facility is about to change that. Fusion experiments are set to begin in 2012.

To read more, go to the Web.

LAS VEGAS REVIEW-JOURNAL **CHARCOAL IN A HARD PLACE**

The Genoa Fault in Nevada.

Hikers wandering through the mountains in the Carson Range can't help but be puzzled when they come across two long and deep trenches in the midst of the alpine forest just north of the California state line.

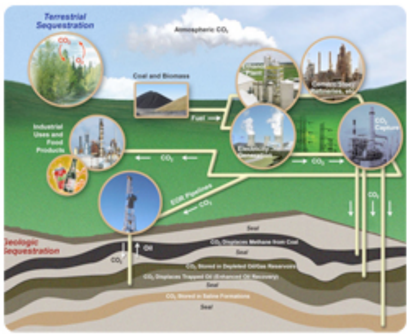
For the last few weeks, geoscientists from the Laboratory and the Nevada Bureau of Mines and Geology have been studying rock fractures and charcoal found in digging the trenches. The fractures were created by earth tremors, and the charcoal is what remains from repeated forest fires over thousands of years.

They want to determine specifically when earthquakes have occurred along the Genoa Fault, the most seismically active fault in Nevada. The charcoal will be put through carbon-14 dating at the Lab's Center for Accelerator Mass Spectrometry to better learn the history of earthquakes along the 25-mile fault that runs from Woodfords, Calif., to south of Carson City.

In coming years, they hope what they learn here along with improved technology will give at least some advanced warning of earthquakes.

To read more, go to the Web.

FOREIGN AFFAIRS — CARBON CAPTURE AT CENTER STAGE



Since 2004, the energy sector has changed dramatically. Key events along the way included Hurricane Katrina, the global financial crisis, the Arab Spring, and the tragedies of the disasters at the Deepwater Horizon oil rig and the Fukushima Daiichi nuclear plant.

The Lab's Carbon Management Leader Julio Friedmann recently opined in the magazine *Foreign Affairs* about how the world's assessment of carbon capture and sequestration (CCS) is basically the same now as it was in 2004: "Yes, CCS remains a critical technology. But more needs to be done to develop and implement it, especially in the policy world," he wrote.

In 2010, roughly 35 billion tons of man-made CO2 entered the atmosphere -- about 70 times the weight of all human beings on earth. That annual volume is about seven billion tons more than it was in 2004, largely because of rapid economic growth in developing countries. Friedmann says energy technology on the whole has not evolved fast enough.

To read more, go to the Web.

Lab Manager MAGAZINE Run Your Lab Like a Business

RAD DETECTION TECHNOLOGIES

Marianne Ammendolia and Morgan Burks examine the next-generation radiation detector, GeMini.

September 11, 2001 was a turning point for the United States. The first major attack on U.S. soil in nearly 60 years and the largest loss of life due to terrorism ever experienced on these shores created a sense of overarching vulnerability, and exposed concerns that once seemed far-fetched yet now more real than once imagined.

"I think there was a realization that it could have been much worse. If the adversary had nuclear capability, they would have used it, and we would have been looking at hundreds of thousands of deaths," LLNL scientist Mike Carter said. "We realized that our pre-9/11 strategy would have failed had they had that capability, and we felt a sense of urgency to change that. There were the building blocks for radiation detection technology out there already, but it wasn't ready for massive-scale, prime-time deployment."

Carter, who has worked in the Lab's nonproliferation and counterterrorism programs, was recruited to Washington shortly after 9/11 to take part in the White House team that helped stand up the Department of Homeland Security, where he led the radiation detection portfolio and directed the development of the national R&D strategy for improving radiation detection technology.

To read more, go to the Web.

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LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

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